



TechShot Takes Research into Orbit

The engineers of Indiana-based TechShot begin any new project with asking the client exactly what the needs are. For some companies, the answer involves sending fragile Japanese quail eggs into orbit while others want to know how living cells, liquids and proteins separate in zero gravity.

As science and medicine evolves, the experimentation process becomes more complex and so does the necessary research equipment. Some research companies realize many of the answers they need to cure disease, develop medications and discover more about the genetic makeup of humans can be found in the outer reaches of space.

Finding creative scientific and fabrication solutions is a specialty of TechShot's engineering staff.

The results of this "out of this world" experimentation in drug microencapsulation, biochemical purification and extraction, protein crystal growth, and colloid dynamics may find its way to the local pharmacies and hospitals in the form of improved medications, cancer diagnostics and treatment, gene therapy and stem cell therapy.

The primary research products TechShot has developed for NASA include an Advanced Space Experiment Processor (ADSEP), the Microfluidic Analytical Separator for Proteomics and a multi-stage electrophoretic separator.

The first incarnation of these products began as "Chix in Space," a student project created by TechShot founders President Mark Deuser and Vice President John Vellinger. As junior inventors, they developed a one-of-a-kind egg incubator for use in the unique environment of space. The duo's project flew on space shuttle mission STS-29 in March 1989, becoming the framework for the company's self-contained experimentation equipment.

The current container is capable of holding three lunchbox-sized interchangeable cassettes containing automated experiments specializing in biological and medical research. The exchangeable cassettes enable multiple companies to perform research on a single flight.

TechShot is one of only four companies in the United States that has an agreement with NASA allowing it to conduct experiments for its own customers on board the space shuttle and International Space Station.

Sending equipment into space costs approximately \$10,000 per pound. The equipment's compact size and exchangeable pieces help reduce the costs associated with experimentation in space. The number of completely interchangeable cassettes that can be processed on a single mission is limited only by spacecraft storage space. The compact design of the product plays a significant role in commercializing expeditions to space.

Astronauts on seven space shuttle missions, three sub-orbital rocket flights and several parabolic aircraft sorties conducted experiments using equipment created by TechShot engineers.

A key to the team's public and commercial success has been their pursuit of grants from the Small Business Innovation Research (SBIR) Program. The 51 SBIR contracts (valued at nearly \$40 million) from eight government agencies enables TechShot to design, build and test equipment that inspires innovations in numerous industries. Partially based on the company's success, the state of Indiana now pays TechShot to help other area companies win SBIR contracts.



Astronaut John Glenn worked with TechShot's ADSEP unit on STS-95 in 1998 – a shuttle mission that included numerous life sciences and research experiments.

About the NASA Innovative Partnerships Program

Innovative Partnerships Program: Adding value to NASA and benefits to the nation. The Innovative Partnerships Program provides specialized technology and capabilities for NASA's mission directorates, programs and projects through investments and partnerships with industry, academia, government agencies and national laboratories. Program supports technology transfer through dual-use partnerships and licensing, while creating socio-economic benefits for the American public.